hESC-secreted proteins can be enriched for multiple regenerative therapies by heparin-binding.

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Authors: Hanadie Yousef, Michael J Conboy, Ju Li, Matthew Zeiderman, Tandis Vazin, Christina Schlesinger, David V Schaffer, Irina M Conboy

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Public Summary:
This work establishes a new method for enriching the pro-regenerative hESC-produced proteins and uncovers their ability to combat neurological disorders in addition to the positive role in enhancing muscle repair.

Scientific Abstract:
This work builds upon our findings that proteins secreted by hESCs exhibit pro-regenerative activity, and determines that hESC-conditioned medium robustly enhances the proliferation of both muscle and neural progenitor cells. Importantly, this work establishes that it is the proteins that bind heparin which are responsible for the pro-myogenic effects of hESC-conditioned medium, and indicates that this strategy is suitable for enriching the potentially therapeutic factors. Additionally, this work shows that hESC-secreted proteins act independently of the mitogen FGF-2, and suggests that FGF-2 is unlikely to be a pro-aging molecule in the physiological decline of old muscle repair. Moreover, hESC-secreted factors improve the viability of human cortical neurons in an Alzheimer's disease (AD) model, suggesting that these factors can enhance the maintenance and regeneration of multiple tissues in the aging body.